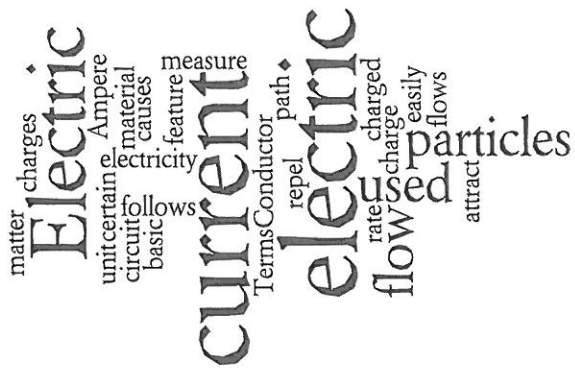
Science



1. The language of science

Science subjects use language to describe, explain and analyse scientific phenomena. Science classes provide a lot of multimodal input and thus support understanding in a variety of ways. By showing learners how to use the visuals accompanying input, teachers can help them to develop strategies for understanding science. Through learning about science, learners develop language for thinking skills, such as reasoning, questioning, creative problem-solving and evaluating. As the language and subject matter become more challenging through the years, learners can become skilled at expressing complex scientific ideas more formally and academically in both speaking and writing. As they develop scientific knowledge and understanding, CLIL learners can be taught how to think, talk and write like scientists.

Examples of input (spoken, written and visual information) in science include the following:

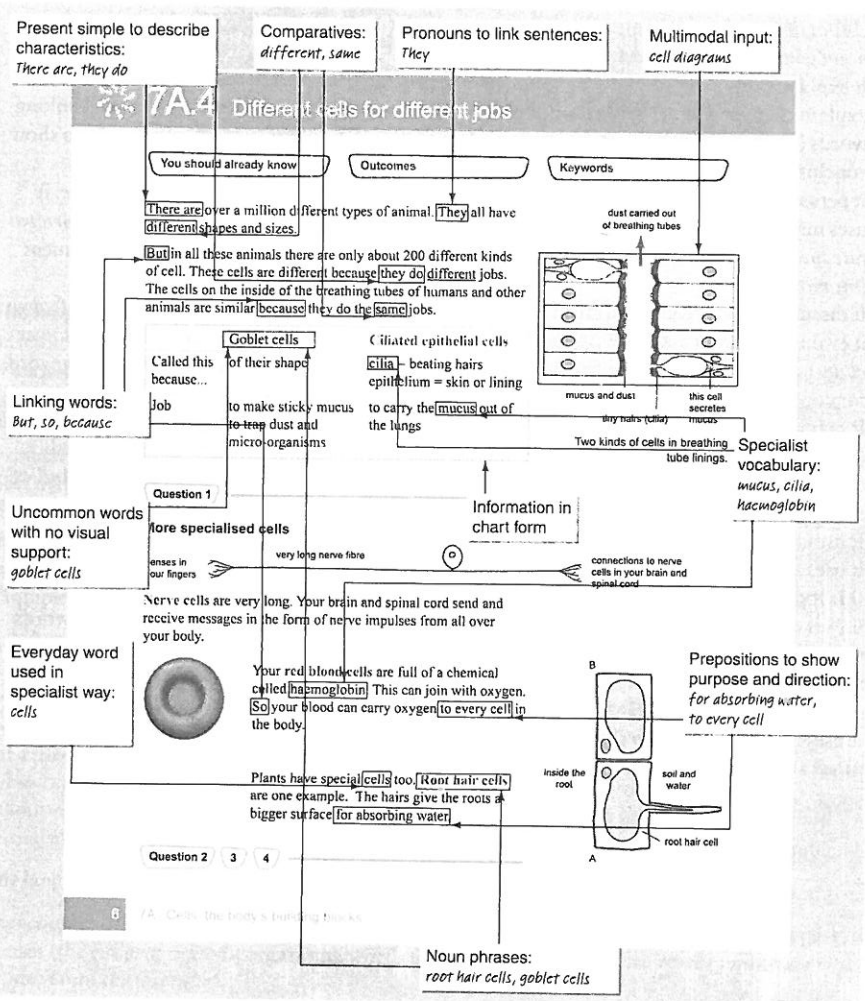
- teacher explanations, instructions and demonstrations related to scientific experiments, processes and concepts
- written texts: scientific articles, laboratory reports, instructions for experiments
- video or audio input: websites on scientific topics, scientific models on the Web (of a heart beating, of a flower opening), online games
- objects and models: animals, plants, scientific equipment, model of atoms and molecules
- hands-on work: experiments, fieldwork and demonstrations, visit to scientific museum
- visuals: pictures, photographs, models, video, diagrams, graphs and charts, the periodic table.

The language of science uses a variety of language functions, genres and text-types. For example:

- It recounts – i.e. retells factual events in chronological order in laboratory reports: it uses past tenses (*the gas evaporated*), organising words for time (*next*), the passive voice (*3 ml of water was poured into the test tube*).
- It describes and informs – i.e. describes scientific phenomena: it uses factual, informative, technical language with no storyline; it explains characteristics (*a carbon molecule consists of*); it uses long, complex sentences with sub-clauses (*So whilst all cells have the same features, such as cell membrane, nucleus and cytoplasm, their appearance can be very different*), numbering words (*it has two chambers*), prepositions (*above*), ordering words (*first, finally*), the language of comparison and contrast (*The greater the amount of light, the more the plant grows*).
- It instructs – for example, how to do experiments: it uses imperatives (*Pour 3 ml of water into the test tube, then add the crystals*), question forms in all tenses to check understanding of instructions (*What do you do next?*), questions by learners to clarify understanding (*Do I have to light it now?*), linking words to number steps (*first, then*).
- It explains – for example, how or why scientific processes work: it uses the present tense to explain cause and effect using time phrases (*As it dissolves, the colour changes*), causal linking words (*because*), determining verbs (*caused it to bubble*), listing words (*thirdly*), verbs to show conclusion (*this shows*).
- It persuades – i.e. attempts to convince someone of a point of view about a scientific issue: it uses numbering words (*There are four main reasons*), data to support arguments (*The survival rate increased by 5%*), the third person (*research shows*), linking words to build an argument (*moreover*).
- It discusses – i.e. presents reasoned arguments on scientific issues from different points of view: it evaluates, argues and gives opinions; uses tentative verbs (*Those in favour of nuclear power claim*), linking words for contrasting ideas (*On the one hand, on the other hand*), linking words for conclusions (*to sum up*).
- It predicts and hypothesises: it uses future tenses (*The water will take longer to boil*), conditionals (*If an object is submerged completely, it displaces its own volume of fluid*), modals to predict (*could*), to emphasise tentativeness (*the flower might grow*) and to recommend (*future studies should*), qualifying words or phrases (*these results might mean*), linking words for effects (*since*).
- It uses figures, symbols or abbreviations with few or no words (e.g. in diagrams, equations).
- It uses abbreviations and symbols derived from Latin (Pb for Lead), Greek (π for pi) or English (He for Helium, f for Force, P for Power).
- It uses many technical terms (*alkali, capacity, molecule*), many Greek- and Latin-based words (*photosynthesis, hydrochloric acid*), everyday words in specialist ways (*table, cell, tissue, action*), words to describe concepts that are difficult to visualise or understand (*power, energy, atom*), similar words with different meanings (*dissolve, solution, solubility, soluble*).
- It uses nouns instead of verbs and adjectives (*motion – moves*), long noun phrases (*water retention rates*) and adjective phrases (*dissolving this acid*).

2. Sample text and comments for science

The main purpose of this text is to describe and explain. It describes the characteristics of animal cells and explains cell processes.



3. Sample language and content aims for science

Speaking

Learners' CEFR level	Sample aim
A1	Learners can name the parts of a flower in a class quiz.
A2	Learners can give instructions on how to carry out an experiment on surface tension.
B1	Learners can explain the difference between speed and velocity in a short presentation.
B2	Learners can discuss the advantages and disadvantages of nuclear power in a debate.

Writing

Learners' CEFR level	Sample aim
A1	Learners can label a diagram of a simple electric circuit in an instruction booklet.
A2	Learners can write instructions for an experiment on solids, liquids and gases for their classmates.
B1	Learners can provide advice for diabetes patients in an A5 flyer.
B2	Learners can evaluate the arguments for and against the use of fossil fuels in a report for Greenpeace.

Grammar

Learners understand how the passive voice is used in a laboratory report when the actor/agent is not important (*I added salt* vs. *salt was added*).
Learners know how to form the passive in the simple past, using *was/were* + past participle.
Learners can use the passive in a report on a class experiment.

Vocabulary

Learners can recognise words relating to the structure of organisms (*organ*, *tissue*, *cell*).
Learners can use specialised words when they recount an experiment on gases (*exert*, *force*, *Styrofoam cup*, *tongs*, *bubble*, *suspension*, *collapse*).
Learners can distinguish words with similar but distinct meanings, (*membrane* and *skin*), or terms that they regularly mix up (*cell wall* and *cell membrane*).
Learners know all the word forms and most common collocations for a word such as *test* (noun: *test*; verb: *test*; common collocations: *test tube*, *blood test*; preposition following test: *tested for*).